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ANALYSIS OF OFFICER PERFORMANCE OF AN EXPERIMENTAL TASK: MARCH ORDER

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(10) William H. Helme

Louis P. Willemin, Task Leader

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Submitted by:
William H. Helme, Chief
Behavioral Evaluation
Research Division

Approved by:
J. E. Uhlaner, Director
Behavior and Systems
Research Laboratory

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A comprehensive longitudinal research program to improve initial classification of officers was undertaken at the recommendation of the Army Scientific Advisory Panel and the Office of the Deputy Chief of Staff for Personnel. The program had two major objectives: to improve selection of effective combat leaders and to determine how effectively psychological measurement techniques can be used in classifying officers differentially into three broad occupational domains--combat, technical, and administrative.

Within this program, 4000 officers were given a battery of experimental measures called the Differential Officer Battery (DOB) on entry to active duty in 1961 and 1962. From this group, a sample of 900 officers representing nine branches of service was chosen to participate in a special three-day exercise of various junior officer duties under simulated combat conditions. The Officer Evaluation Center (OEC) was established for this purpose at Fort McClellan, Alabama. From early 1963 to 1965, the 900 officers went through the exercise consisting of 15 situational tasks--five tasks pertinent to each of three areas: combat, technical, and administrative. A staff of 17 officers and 41 enlisted men conducted the situational tasks as actors, observers, and recorders of performance, including evaluations of overall performance characteristics of the officer subjects. The recorded observations, evaluations, and products of performance were then analyzed to yield dimensions of performance in each of the 15 tasks. Findings from analysis of results on one of the combat tasks, the March Order problem, are presented here.

OBJECTIVES OF THE ANALYSIS

Primary objectives were to discover the dimensions of behavior measured and to provide scores on these dimensions and the task as a whole. These scores are to be related to scores in the other 14 situation tasks, to predictor scores from the DOB, and to on-job performance evaluations on active Army service. Findings of this and parallel studies will be applied in techniques for evaluation of junior officer performance, for early identification of most promising leaders, and for use in initial classification of cadets to Army branches of service.

METHOD OF ATTACK

THE SITUATIONAL TASK

The March Order Task was designed to measure the officer's ability to plan a tactical road march under time and situational pressures. The officer is located in a bunker under simulated guerrilla conditions. He must work out the problem in the pre-dawn hours, having had little sleep

for 48 hours. Besides the time and combat stress, he is subjected to interruptions from superior and subordinate personnel. Provided with a map and information on enemy forces, he is required to write a march order to link up two friendly guerrilla units.

SAMPLE

Of the 900 officers attending the OEC, the last 820 cases were used for the analysis of the March Order task because certain changes in recording and evaluation procedures had been made after the earliest cases were put through the simulation. Most variables derived here can be adapted for scoring the earlier cases, however.

VARIABLES

Category of assignment (combat, technical, administrative), component (Regular Army or Reserve), and grade (first or second Lieutenant) were available as population control variables. Performance variables were obtained on three instruments: the March Order Performance Checklist consisting of 13 items on interactions with personnel and 43 items on the March Order itself, the Descriptive Report containing 10 items on factors in manner of performance, and two global ratings on motivation and attitude. Qualitative comments were also provided for, but utilized in only a few cases. The list of variables analyzed appears in Table 1.

ANALYSIS PROCEDURE

After deletion of 10 variables with extreme p-values (beyond .05 - .95 limits), a matrix of tetrachoric intercorrelation coefficients was computed for the remaining 58 variables[1], factored by the principal components method (unity in the diagonals), and the factors were rotated by the varimax procedure. A ten-factor solution, accounting for 45% of the total variance, was selected. Factor scales were constructed on the basis of highest loadings of given items, and modified slightly on the basis of content where there were nearly equal loadings on more than one factor. These scales were intercorrelated in a matrix including the motivation and attitude scores and other scales composed of items which were not in the factor scales. A total score and 11 scale scores were finally derived for use in computing correlation coefficients across different situational tasks and for validation of the DOB.

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[1] Motivation and attitude scales were not included in the factor analysis.

Table 1

OBSERVATIONS AND EVALUATIONS IN MARCH ORDER TASK

Content	Items
Interactions with Personnel	
Worried EM (Messenger)	1-8
Talkative Officer	9-13
Content of March Order	
Heading	14-16
Situation	17-20
Mission	21-24
Execution	
March unit instructions	25-29
Coordinating instructions	30-35
Administration and Logistics	36-37
Command and Signal	38
Road Movement Table	
Time and rate instructions	39-44
First march unit directive	45-52
Later march unit directives	53-56
Descriptive Report	
Manner of Performance	57-66
Motivation	67[a]
Attitude	68[a]

[a] Five-point scale

RESULTS

The factor analysis of items recorded in the March Order task yielded 10 factors (Table 2). These factors represented fairly clear-cut aspects of the task, seven of them--I through V, VII, and VIII--dealing with provisions of the march order, and the remaining three dealing with interactions with a talkative senior officer and an anxious enlisted messenger.

Only nine scales were derived from the factors because the two rather weak officer interaction factors were combined in a single scale. To maintain distinctness of scales and homogeneity of content, the mission accomplishment ratings were excluded from the Factor II scale on the basic march unit plan, the items in Factor VI which were also part of the mission outline in Factor V were excluded from VI, and the two manner of performance ratings, weakly loading only on Factor IX, were excluded from the officer interaction scale.

Table 2

FACTORS DERIVED IN MARCH ORDER TASK

			Factor Loading	
		Items	Mean	Range
I.	Noting enemy positions	17-19	.84	.82 - .86
II.	Planning basic march unit	43-52	.61	.36 - .76
	Mission accomplishment rating[a]	62-63	.50	.39 - .62
III.	Planning later march units	53-56	.88	.80 - .92
IV.	Maintaining contact and security	31-33	.74	.59 - .82
V.	Outlining mission and execution	21-29	.58	.35 - .73
VI.	Ready response to officer[b]	9-10	.44	.43 - .45
	Information on units link-up time[a]	27-28	.52	.52 - .52
VII.	Providing equipment and supplies	34-38	.66	.44 - .89
VIII.	Giving headings and references	39-40, 16, 42	.52	.25 - .72
IX.	Brevity of interaction with officer[b]	11-13,	.49	.20 - .64
	Endurance and general impression[a]	60, 65	.24	.20 - .27
X.	Interaction with EM	2-3, 5, 7, 8	.40	.24 - .54

[a] Not included in factor scale.

[b] Combined in single scale.

In addition to the nine factor scales, a total score and two other scales were constructed. The officer interaction items were augmented by the endurance and general impression ratings to form a more comprehensive command behavior scale; and the hearing and following instructions ratings, which had loaded .25 and .22 on Factor II, were combined with ratings on mission accomplishment, direction, and attitude, to comprise a drive for mission accomplishment score. The total score was made up of factor scales I through V, and VII, which comprised the full provisions of the march order.

Intercorrelations among the 11 scales and the total score are given in Table 3. The common variance is slightly less than half the total. The total score appears to depend on two components: 1) completeness of the march order, as represented by outlining mission, equipment and supply, noting enemy positions, and march order for basic and later units; and 2) drive for mission accomplishment. A third component common to officer interactions and command behavior is mainly a function of the part-whole relationship. Interactions with enlisted men is a unique factor.

Table 3

CORRELATION AMONG SELECTED SCALES OF THE MARCH ORDER TASK

Scale	Intercorrelation[a]											
1 - Noting enemy positions	1											
2 - March order - basic unit	03	2										
3 - March order - later units	03	41	3									
4 - Contact - security	18	-04	-06	4								
5 - Outlining mission	45	21	15	27	5							
6 - Equipment and supply	47	03	04	40	50	6						
7 - Headings - references	19	18	23	06	22	25	7					
8 - Officer interaction	14	19	14	12	22	18	07	8				
9 - EM interaction	00	-02	-04	07	01	06	08	04	9			
10 - Command behavior	16	22	21	13	24	18	05	87[b]	05	10		
11 - Drive to accomplish mission	27	62	39	12	44	31	33	23	02	28	11	
12 - Total score	47[b]	66[b]	52[b]	33[b]	72[b]	58[b]	46	28	01	32	76	12

[a] Decimal points omitted

[b] Part-whole relationships

SUMMARY

Internal analysis of the March Order situational task of the OEC exercise yielded 11 component scores and a total task performance score. Six components represented aspects of responsibility of the officer in planning the march order: noting enemy disposition, maintaining contact and security, providing equipment and supplies, outlining mission and execution, and specifying arrival times and other actions at each point for the lead march unit and the following units. Other components represented administrative provisions, interaction with a senior officer and an EM, and overall evaluations relevant to command behavior and drive to accomplish mission. The total task score reflected: 1) the march order preparations and key specifications of the march route; and 2) drive to accomplish mission.

The 11 component scores and the total score are designed to be used in determining relationships of recorded behavior across all 15 situational tasks administered at the OEC, and to serve as criteria for validation of the predictor batteries in the whole longitudinal officer prediction research.

APPENDIX - TABLES OF RESULTS

Table A-1

PERCENT OF TOTAL VARIANCE ACCOUNTED FOR BY NUMBER OF ROTATED FACTORS

No. of Factors	Percent of Variance
	24.27
2	29.01
3	32.32
4	35.24
5	37.77
6	39.91
7	41.63
8	43.32
9	44.80

Table A-2

FINAL ROTATED FACTOR MATRIX

	Variables																										
Factor	2	3	5	6	7	8	9	10	11	12	13	15	16	17	18	19	21	22	23	24	25	26	27	28	30	31	32
I	02	-02	06	-03	-05	03	-03	03	08	02	01	00	17	85	86	83	22	21	00	23	10	03	01	-01	11	04	12
II	-04	-04	-03	02	01	04	21	02	08	07	02	01	07	03	01	03	08	00	19	06	05	05	12	12	10	12	11
III	04	-01	-02	-07	-07	03	09	-01	02	03	04	-10	-03	00	01	00	02	04	03	00	04	05	02	07	05	06	-11
IV	06	00	07	04	-04	07	-02	00	01	01	06	-04	02	06	04	07	04	05	04	05	08	14	03	04	13	07	13
V	-04	-01	-01	05	03	-05	01	08	05	06	04	10	26	27	29	28	69	72	30	63	73	65	51	35	61	07	08
VI	02	-05	08	07	00	-06	-45	43	-14	00	07	02	00	00	-02	-03	02	14	-33	03	01	-21	-52	-52	-21	-17	04
VII	00	-02	-01	-03	06	05	-03	09	04	08	03	06	07	23	24	22	21	17	05	14	21	14	11	14	26	09	04
VIII	-03	02	03	09	06	01	01	05	-01	-01	-03	18	45	08	07	05	05	05	11	07	03	04	04	01	03	00	-04
IX	02	-02	03	-04	-01	10	11	08	20	63	64	-06	-18	05	05	06	08	09	16	00	07	-01	07	11	-01	-04	16
X	49	54	30	04	24	-45	-11	12	05	-03	-12	-06	00	-01	-01	01	00	-06	-06	-02	01	03	05	05	04	-01	-01
h^2	24	29	11	03	07	23	28	23	08	42	44	06	34	86	89	81	59	62	32	48	60	52	57	44	51	05	13

Table A-2 continued

	Variables																										
Factor	33	34	35	36	37	38	39	40	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
I	02	08	17	19	16	07	04	02	-01	-02	03	08	-04	-04	02	00	02	-05	03	02	00	01	01				
II	-06	07	05	-02	-03	01	08	03	22	41	38	53	67	73	75	64	70	75	07	53	04	03	02	07			
III	-06	-02	-01	05	03	01	16	10	24	27	-05	13	08	08	10	09	09	18	07	10	01	08	00	01	04		
IV	82	08	12	12	12	23	01	01	05	06	-01	-03	00	-01	-01	-01	00	-05	-05	00	-02	-05	-07	03			
V	15	15	22	27	26	22	-03	01	03	05	04	06	01	07	04	02	06	00	05	04	04	05	09	07			
VI	-02	07	-03	-07	-06	-01	01	-05	-02	04	-01	-11	-08	00	-02	-11	00	00	-05	-04	-03	-05	-10	-00	-04		
VII	16	44	84	87	89	47	13	08	04	01	-05	04	-04	02	00	01	01	03	00	01	-01	00	02	05			
VIII	02	14	07	02	09	05	85	72	25	14	09	06	01	00	-03	02	-06	-05	04	04	03	05	04	00			
IX	01	07	06	05	05	03	05	00	08	15	-02	10	03	10	02	06	-03	-01	02	10	05	03	05	01	07		
X	04	-05	03	-01	00	05	02	10	01	03	02	-10	-01	-02	-02	-08	-01	00	00	-03	-00	-04	-07	01			
h^2	74	27	52	90	91	33	47	55	18	30	14	34	47	55	59	32	51	56	48	77	30	60	44	35			

Table A-3

MEANS AND STANDARD DEVIATIONS OF FINAL VARIABLES SELECTED IN MARCH ORDER TASK

Variable	M	SD
Noting enemy positions	2.57	1.00
March order - basic unit	4.52	3.18
March order - later units	2.01	1.88
Contact - security	1.10	1.22
Outlining mission	6.43	2.61
Equipment and supply	3.13	1.77
Headings - references	2.52	1.21
Officer interaction	2.82	1.15
EM interaction	1.97	.97
Command behavior	5.40	1.53
Drive to accomplish mission	9.01	2.59
Total score	23.97	8.35